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USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Enhanced Preliminary Assessment Report:

Shelton Army Housing Units Shelton, Connecticut

October 1989

prepared for

Commander
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

prepared by

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Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Shelton, CT. The objectives of this assessment include identifying and characterizing all environmentally significant operations, identifying areas of environmental contamination that may require immediate remedial actions, identifying other actions which may be necessary to resolve all identified environmental problems, and identifying other environmental concerns that may present impediments to the expeditious sale of this property.

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SUMMARY

The Shelton housing area occupies 18.65 acres and includes both military housing and a contiguous former missile battery operational site. Only the actual housing area (approximately 4.2 acres) is scheduled to be excessed under the Base Closure program. This enhanced preliminary assessment, however, addresses both the housing area and the contiguous fire-control site. At the time of original development, the fire-control site supplied water and sewage services for the housing area. The area was switched over later to city water, but the control site continued to provide sewage-treatment facilities for the housing area until the units were vacated earlier in 1989. The area does not represent an imminent or substantial threat to human health or the environment.

The long history of sewage problems documented for this area results primarily from the low percolation rate of the soils. The repeated failures of the sewage system and the prohibitive costs of permanent solutions are the principal reasons why the housing units were vacated and boarded up. The property has been recommended for excess since 1984, when a permanent, affordable solution to the sewage problems could not be identified. At that time, it was determined that any maintenance of the area would only be temporary and limited to minimal upkeep.

The sewage problems suggest probable waste migration from the former missile-control site to the housing area, although no documentation exists to confirm this. The housing units are located downslope from the leach field on the control site. No sampling has been conducted to confirm that the waste overflow problems have involved only biodegradable wastes displaced from the treatment facility.

Six environmental impacts have been identified on this property: (1) sewage system failures, (2) possible leakage from the original underground fuel-oil heating tanks, (3) transformers on the control site that may contain PCBs, (4) drums of hazardous materials stored in the headquarters building, (5) presence of asbestos inside the housing units and in the buildings on the former missile-control site, and (6) waste recovered from the original leach field that was buried on the former control site.

Prior to property excess, one action is recommended for the housing area per se:

- Remove the original underground tanks behind each housing unit; remove any contaminated soils encountered; sample soils in the tank excavations to confirm the absence of petroleum contamination.

The recommendation assumes that the housing area will resume its housing function. Although the former missile-control site is not scheduled to be excessed at this time, the following actions are nevertheless recommended for it:

- Remove the abandoned underground storage tanks located on the control site; remove any contaminated soils encountered; sample tank excavations for petroleum contamination.

- Remove the out-of-service transformers located on the former missile-control site and sample for PCBs.

- Remove the drums of hazardous materials stored in the headquarters building of the former control site to a more secure storage area or dispose of these materials properly.

- Sample the area on the control site where wastes previously removed from the original sewage-treatment system had been buried to confirm the absence of hazardous constituents.

- Sample the current leach field and septic tank for contaminants characteristic of missile-related wastes expected to have been generated as a result of missile-control activities.

- Sample groundwater from the well on the former control site for contaminants characteristic of missile-control activities.

1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Shelton housing area addressed in this preliminary assessment.[1]

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area in Shelton, Conn.

1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

1.3 PROCEDURES

The PA began with a review of Army Housing records located at Fort Devens, Mass., during the week of May 15-19, 1989. Additional information was obtained from the Family Housing Office, Fort Nathan Hale, in New Haven, Conn., and from conversations with personnel from the Area Facility Maintenance Office in Windsor Locks, Conn., during the week of July 17-21. A site visit was conducted at Shelton, Conn., on July 17, 1989, at which time additional information was obtained through personal observations of ANL investigators. A return visit to Fort Devens was made August 3-4 to obtain necessary information on the former missile-control site included in the housing property. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

This report identifies the former Nike fire-control site and housing unit area as one property because it is treated as such in the Fort Devens documentation; only the 4.2-acre housing area is scheduled for excessing, however, under the Base Closure program.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

Attempts to gain access to the housing units were unsuccessful during the first site visit. Therefore, internal inspection of the units was not possible during that visit. However, ANL investigators revisited the property on September 8, 1989, at which time the interiors of all but one of the units (unit #12) were inspected.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The Shelton housing area totals 18.65 acres, with actual housing occupying 4.2 acres. The remaining acreage consists of the former fire-control site of a decommissioned Nike battery.[2] The parcel on which the housing units are located lies partially in the town of Monroe, but most of the land is in Shelton. Both locations are in Fairfield County.[3] Only the housing unit parcel (4.2 acres) is scheduled to be excessed under the Base Closure program.

Buildings located in the former missile-control area of a Nike missile antiaircraft battery consist of a sentry station, company headquarters building, enlisted mess building, pump station, and enlisted barracks. A sewage-disposal system located west of the buildings consists of a 15,000-gallon septic tank, a pumping station, and a leaching field of 30,000 square feet. The disposal system provided the family housing area, as well as buildings on the control site, with sanitary facilities.

The area of the former Nike fire-control site evidences vandalism both in the abandoned buildings and on the property. Miscellaneous garbage has been piled on the site, and broken windows were noted during the site investigation.

The family housing area consists of 16 "Capehart"-style houses. Capehart is the model name assigned to these houses by the builder, National Homes. None of the units is occupied now. The last house was vacated in June 1989, and all houses are boarded up. Each lot is graded, with individual houses placed on step-like terraces.

There is a moderate slope downward to the east of the housing area; on the neighboring property are private residential homes and woodland. To the north are Jones Tree Farm and an access road leading up-hill to the Nike control site. More private residences border the west and south sides of the property. No historic sites are within 2 kilometers (km) of the facility.[4]

Figures 1 and 2 show the general location of the facility.

2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the housing property.

2.2.1 Former Nike Missile Fire-Control Site

Figure 4 presents the former fire-control area's site plan.

Mess Hall

This is a one-story building with a concrete floor, masonry block walls, and roof built up with insulation. Two underground storage tanks, each with a 500-gallon

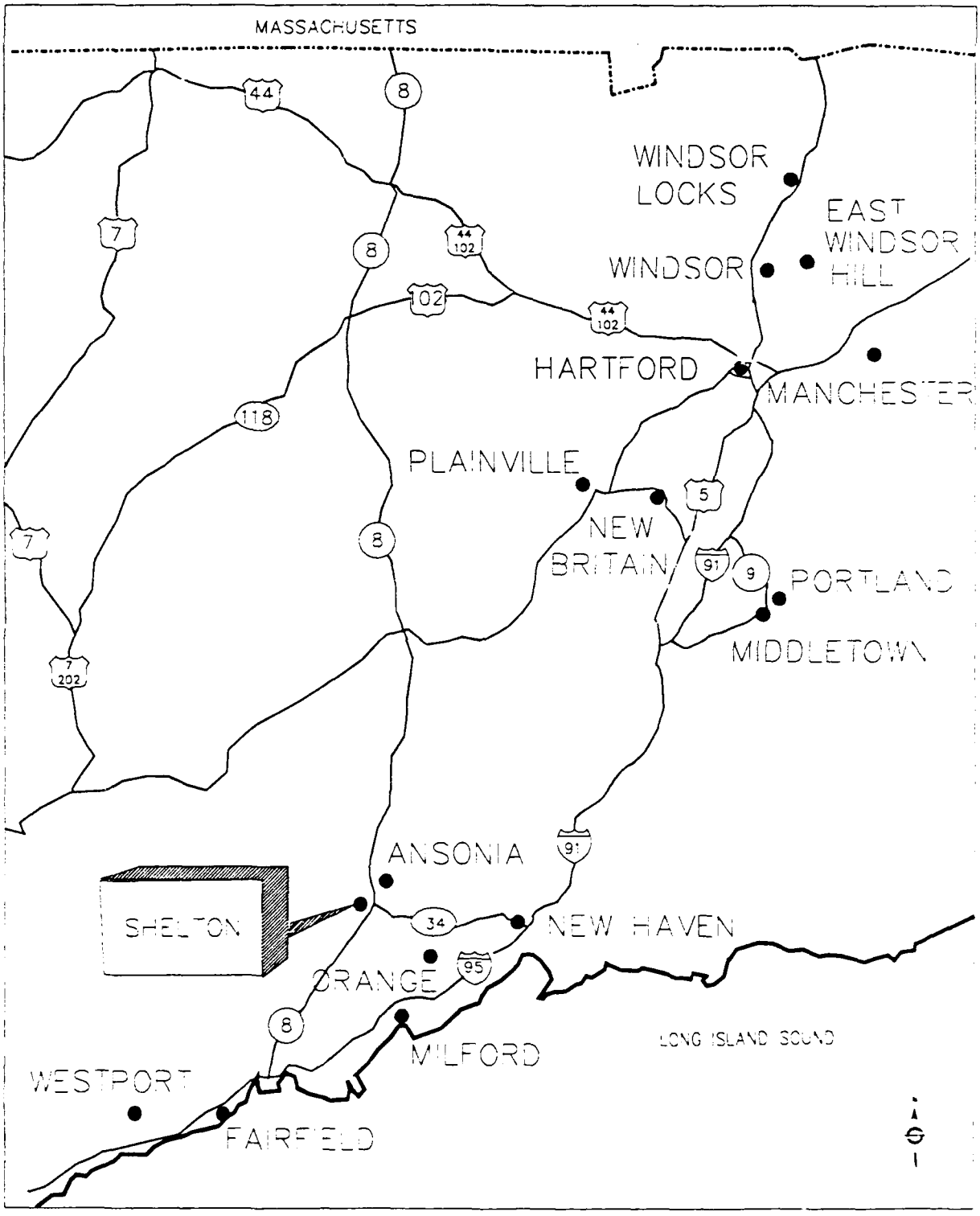


FIGURE 1 Location Map of Connecticut Army Housing Facilities

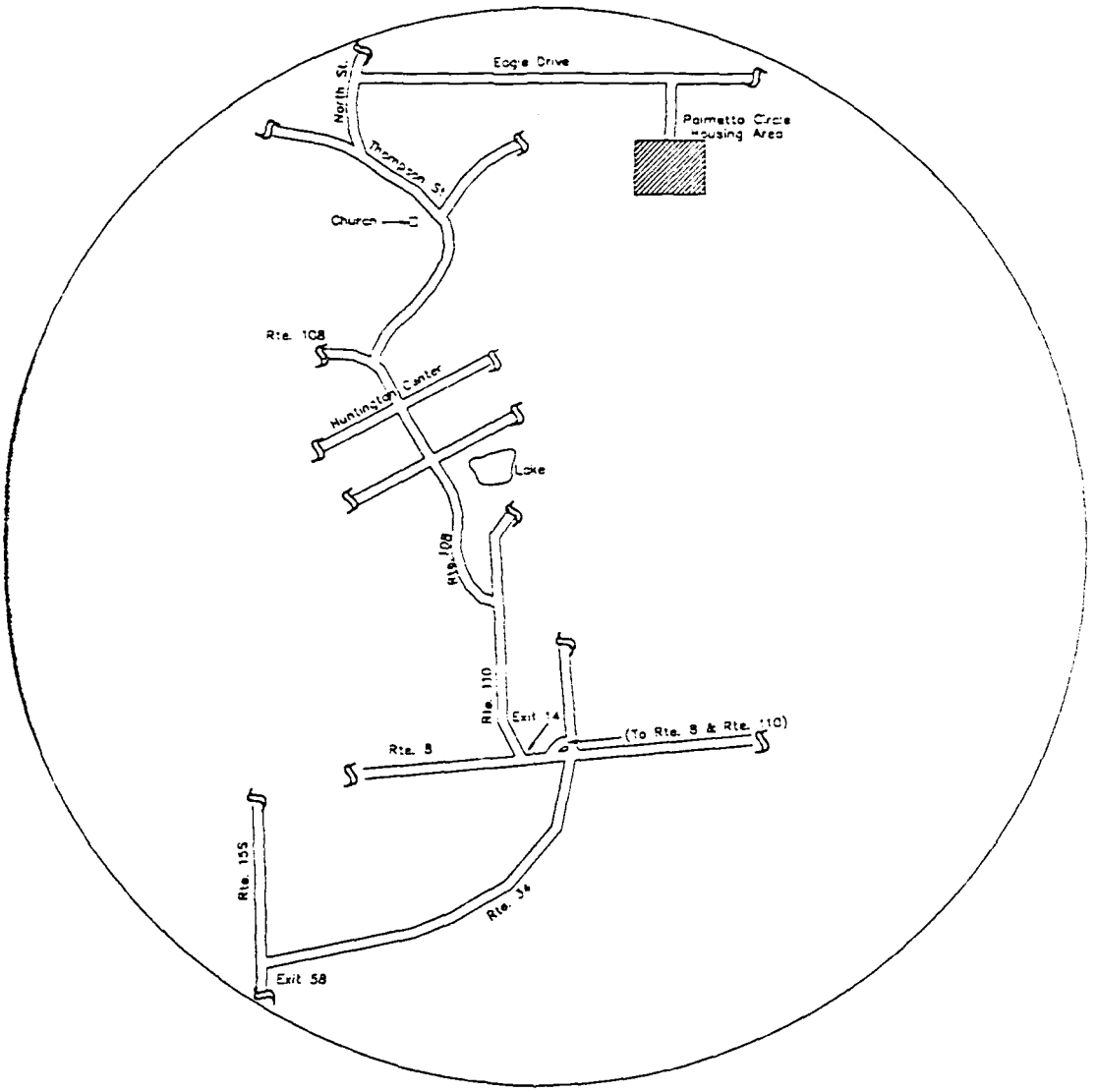


FIGURE 2 Vicinity Map of Shelton Army Housing Units

capacity, were used for gas service to supply cooking facilities. A 1,500-gallon underground fuel oil tank was used to supply heating fuel to the building.[5,6] All three of these tanks are believed to have been abandoned in place, although details of their decommissioning could not be located.

Enlisted Barracks and Officer Quarters

This is a one-story building with a concrete floor covered by asphalt tiles, masonry block walls, and wood roof built up with insulation. A 2,000-gallon underground fuel oil tank supplied heating fuel to the building.[5,6] This tank is believed to have been abandoned in place.

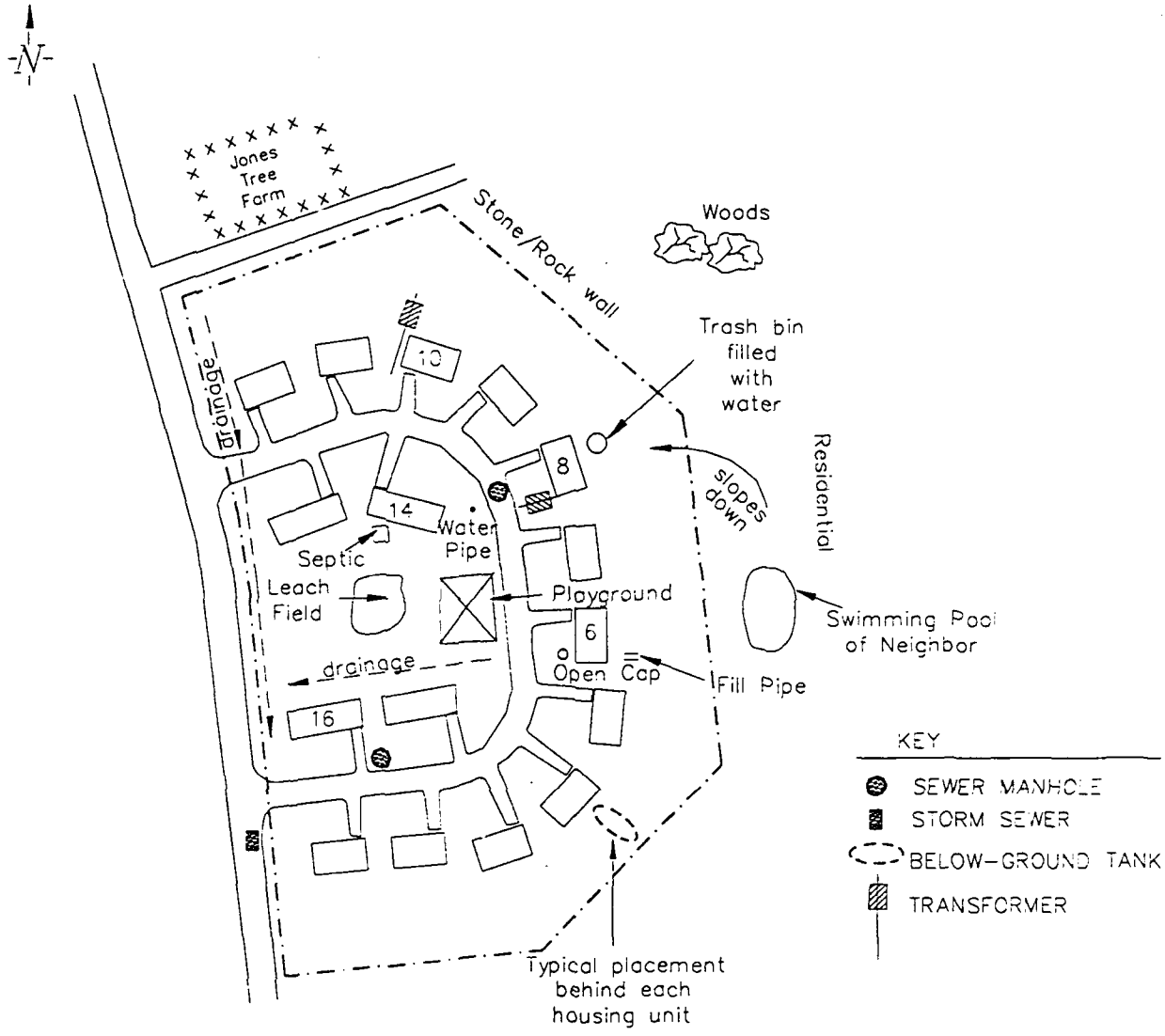


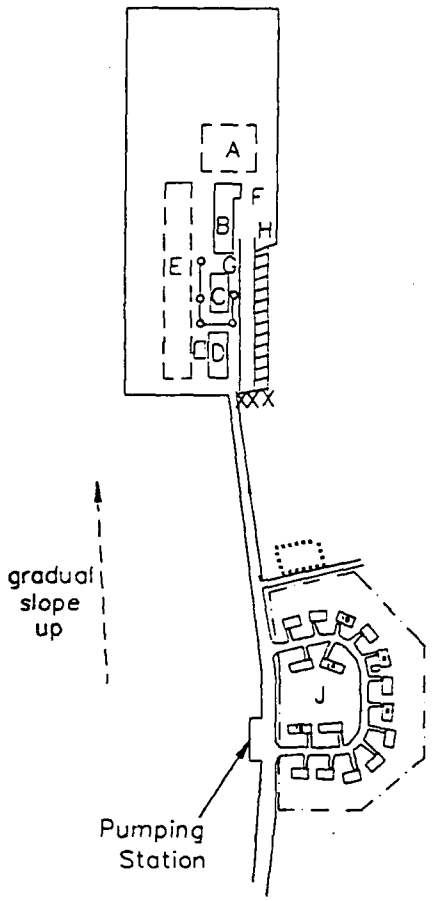
FIGURE 3 Site Plan Map of Shelton Army Housing Units

Headquarters Building

This is a one-story building with a concrete floor, masonry block walls, and a wood roof built up with insulation. A 1,500-gallon underground fuel oil tank supplied heating fuel to the building.[5,6] This tank is believed to have been abandoned in place.

Pump House for Water Well

This is a one-story, 280-square-foot cinder block building with a 3,000-gallon pneumatic tank and two 12,000-gallon water-storage tanks.[5] It is presumed that the



KEY

A. Location of buried waste from old leach field
B. Barracks building
C. Mess Hall
D. Headquarters building
E. Leaching field
F. Water Pumping Station
G. To be constructed fence
H. Easement over Government Land
I. Eagle Drive
J. Family housing area

FIGURE 4 Map of Former Nike Control Site, Adjacent to Housing Area

water pumping system was abandoned in operating order; no documentation indicating that the well was sealed off was found. Percolation tests on the fire-control area suggest that groundwater can be reached 6-7 feet below grade. No specifics on construction or current status of the well were found.

Sentry Box

This is a 24-square-foot concrete building with concrete block foundation walls, concrete floor slab, and wood roof built up with insulation.[5]

Sewage-Disposal System

The existing sewage-disposal system comprises a 15,000-gallon septic tank, a pumping station, and a 30,000-square-foot leaching field.[3] The leach field was rehabilitated since its original construction in 1961, having the new field built on top of the old field.

Fuel Storage

Three underground tanks supplied heating fuel to the buildings on the former fire-control site. Behind the mess hall is a 1,500-gallon tank; behind the barracks and officer quarters is a 2,000-gallon tank; another 1,500-gallon tank is buried behind the headquarters building. The current status of these tanks is unknown. They all are believed to have been abandoned in place, but details of their decommissioning could not be located.

2.2.2 Family Housing Area

Housing Units

All 16 houses are three-bedroom units constructed in 1958. Four homes have carports attached.[7] All homes are built on a concrete foundation covered by vinyl-asbestos tiles. The walls are wood frame with cedar shakes, and the wood roof has an asphalt shingle covering. Each house has an individual forced-air heater with an oil burner; heating ducts are embedded in the concrete floor.[8,9]

Utilities

The housing was probably supplied with water by the pumping station located on the adjacent fire-control site at the time of original development. It is also possible the well located on the control site supplied water to the Nike launch site, since the distance between the control and launcher sites is estimated to be only two miles. No documentation was found to support this assumption, however. The housing area now receives city water. The date on which this service began is unknown.

The property is supplied with electricity from the city of Shelton, and all telephone poles and electrical transformers on-site are believed to be owned by Shelton's power company. No documentation is available on the possible presence of PCBs in the transformers. However, no evidence of spills or leaks was observed.

Two easements (3.10 and 0.39 acres, respectively) are used for utilities and for an access road from North Street, passing the housing area and leading to the entrance of the former fire-control area.[2] Water and electric lines are parallel to the access road, with feeder lines to each house.[4] When the houses were occupied, solid waste (garbage) was collected from the property by a private contractor.

Sewage

Each house was originally built with a cast iron sewer line connecting it to an individual system, consisting of a septic tank, distributor box, and leach field.[8,9] Sometime during the property's history (specific date unknown), use of individual septic tanks was discontinued and the area hooked up to a central septic leaching field on the

former fire-control site. It is assumed that the septic tanks were abandoned in place. After the original system failed, and during the period of most recent occupancy, the homes had sewage pumped from a sanitary lift station located on the west side of the access road across from the housing area; the sewage was then collected and carried away by a local contractor.

Fuel Storage

All houses were originally constructed with 275-gallon underground fuel storage tanks.[8,9] These 30-year-old tanks were still in use when the property was closed; they are still buried at the rear of the houses. The current status of these tanks cannot be determined, but there is no documentation of spills or leaks from them. The details of decommissioning the tanks were not found.

Storm Drainage Systems

The property is drained by open ditches or surface runoff.

Other Permanent Structures or Property Improvements

A sewage lift station is across Eagle Drive, on the west border of the property. Each house has a 15-gallon underground garbage container in the backyard.[9] These are no longer in use.

2.3 PROPERTY HISTORY

2.3.1 Nike Defense Program and Typical Battery-Level Practices

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers[10] and the other by the U.S. Army Toxic and Hazardous Materials Agency.[11] In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or excessed to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. Where housing areas received various utilities from

either of the operating areas, it is possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

2.3.2 Former Fire-Control Site of Decommissioned Nike Battery

In 1975, approximately 10.7 acres (existing between the towns of Monroe and Shelton) of the former fire-control site were excessed to private ownership. Previously, this land was a recreation area for the fire-control site.[12] The report of excess states the following items were on the excessed land: a communication center building; a stand-by generator plant; 833 square yards of paved road; 148 square yards of sidewalk; and a 2,236-foot link fence.[13]

On September 29, 1983, a fire occurred in the pump house on the former fire-control site.[14] No additional documentation was found on this fire during the site visit.

The original septic system has been upgraded, as discussed in Sec. 3.

Although a variety of wastes was associated with Nike battery operations, including benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene, no evidence was found to suggest these types of waste were disposed on the Shelton fire-control site.

2.3.3 Shelton Housing Area

The Shelton housing area was constructed in 1958, adjacent to the Shelton Nike control site. Sixteen single-family houses were erected on the property. This property has a long history of sewage problems caused both by the system adopted and the geology of the area. (The sewage problems are discussed in detail in Sec. 3.) After considering a number of alternatives, the New York District Army Corps of Engineers decided in 1980 that the leachate from the housing units could not be properly treated in the existing system, even with modifications. An interim solution of periodically pumping the sewage from the septic tank was adopted until finally, in 1984, it was recommended that the site should be abandoned.[15]

Since May 1985, 10 units were kept inactive to reduce the amount of effluent going into the system.[16] In June 1989, the last of the six remaining units was vacated, and all houses were boarded-up.

Since the property development in 1958, no other permanent structures have been added. The only renovation to the houses was the installation of smoke/heat detectors in 1979.[8]

2.4 ENVIRONMENTAL SETTING AND LAND USE

The land adjacent to the installation is suburban. The climate is mild, averaging 50°F temperature.

The soils in the area are silty sandy soil, with drainage characteristics ranging from poor to practically impervious. The low permeability of the soil restricts the leachate capacity that can percolate through the soil.

The nearest water sources are Nelson Brook 1.0 km to the north; Means Brook 1.5 km to the east; and Sharpes Brook 1.3 km to the south.[4]

2.5 GEOLOGIC AND HYDROLOGIC FEATURES

Shelton is located in the Lower Housatonic River Basin of the New England section of the New England Physiographic Province. The 557 square miles of the lower Housatonic River Basin in western Connecticut include the basins of two major tributaries, the Pomperaug and Naugatuck rivers. Nearly all water is derived from precipitation, which averaged 47 inches per year during the period 1931 to 1960. In this period, an additional 570 billion gallons of water per year entered the basin in the main stem of the Housatonic River at Lake Lillinonah, and some water was imported by water-supply systems from outside the basin. Of the total annual precipitation, 21.6 inches is lost from the basin by evapotranspiration. Small amounts of water are exported; the remainder is discharged as runoff to the underflow entering Long Island Sound.[17]

Of the 37 principal lakes, ponds, and reservoirs in the basin, six have usable storage capacities of more than 1 billion gallons each. The "maximum safe draft rate" of the largest of these, Thomaston Reservoir near Thomaston, is 75.6 million gallons per day for the 10-year and 20-year recurrence intervals of annual lowest mean flow.

Floods in the region have occurred during every month. The two greatest floods on the Naugatuck River occurred two months apart in 1955. The larger of these, occurring in August, had a peak of 106,000 cubic feet per second at Beacon Falls. Since then, the likelihood of major floods has been considerably reduced by a program of flood control in the basin.

Water can be obtained from three types of aquifers underlying the basin -- stratified drift, till, and bedrock. Stratified drift covers about 16% of the basin, mostly in valleys and lowlands, and its saturated part generally ranges in thickness from 10 feet in small valleys to 200 feet in the Housatonic River Valley. Its transmissivity ranges from 0 to 47,000 square feet per day. Till, deposited directly by glacial ice, forms a widespread but discontinuous mantle over bedrock in most upland areas and extends beneath stratified drift in lowlands; it ranges in thickness from 0 to 200 feet. Crystalline bedrock underlies most of the basin and is composed principally of granite, gneiss, and schist. Sedimentary-volcanic bedrock underlies only the Pomperaug River Basin. Regardless of rock type, water is obtained mostly from fractures.

Stream bed deposits are significant features of the hydrogeologic system because they affect the amount of water from streams and lakes that can be induced to infiltrate aquifers. Based on field tests, characteristic values of vertical hydraulic conductivity of stream bed deposits are 0.40 feet per day (ft/day) for fine-grained deposits and 14 ft/day for gravelly deposits.

Groundwater supplies generally range in yield from several million gallons per day for large well fields to 1 gallon per minute (gal/min) for single wells. Large supplies, with yields of 100 gal/min or more from individual wells, are most commonly obtained from stratified drift. Yields projected from screened wells tapping an aquifer can be calculated by use of a series of graphs in conjunction with estimates of transmissivity and aquifer thickness.

Small to moderate water supplies can be obtained from any of the aquifers under suitable conditions. For example, data from 294 wells in the basin indicate that yields of a few gallons per minute can be obtained from bedrock at most sites. The likelihood of obtaining an adequate domestic supply is slightly greater in granite than in schist and also is greater where the overburden is stratified drift rather than till.

Where unaffected by man's activities, the calcium-magnesium-bicarbonate water in the basin is generally low in dissolved-solids concentration and soft to moderately hard. In general, stream flow is less mineralized than groundwater, particularly when it consists largely of direct runoff. However, stream flow becomes more highly mineralized during low-flow conditions; most of it then consists of more highly mineralized water discharged from aquifers. Iron and manganese occur naturally in objectionable concentrations in parts of the basin, particularly in streams that drain swamps and in water from bedrock that contains iron- and manganese-bearing minerals.

Man's activities have degraded the quality of water in streams in much of the basin, except in the Pomperaug subbasin. In the Naugatuck River Basin, the degradation in quality is shown by wide and erratic changes in dissolved-solids concentration, excessive amounts of certain trace elements, a low dissolved-oxygen content, and abnormally high temperatures. Ground water is degraded principally by induced infiltration of stream water containing chemical wastes, by wastes stored on the ground, and by effluents from septic tanks.[17]

Below its confluence with the Naugatuck River, much of the Housatonic River and adjoining marshes, wetlands, and aquifers contain salt water. Measurements of specific conductance during low-flow conditions in 1969 indicate that the dissolved-solids concentration of water in the estuary ranges from 219 milligrams per liter (mg/L) near Two Mile Island to 20,000 mg/L near Long Island Sound.

The quantity and quality of water in the basin are satisfactory for a wide variety of uses, and, with suitable treatment, the water may be used for most purposes. In 1967, the total amount of water used in the basin was about 194 billion gallons. About 90% of this was used for industrial purposes, and 95% of the industrial water was obtained from surface-water sources. In the same year, 17 municipal and private water-supply systems supplied water of satisfactory quality to about three-fourths of the region's population.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 SEPTIC SYSTEM PROBLEMS

The Shelton housing area has a long history of sewage problems. At the time of original construction in 1958, each house had an individual septic tank and leaching field. These were abandoned, probably because of their repeated failures. A new septic system was installed; the sewage from the houses was passed through a lift station to a single leach field located on the adjacent former fire-control site. This project was completed sometime before 1973. The individual septic systems are believed to have been abandoned in place.

In 1973, a complaint of an adjacent landowner alleged the sewage pump was in bad working condition, causing sewage to be poured onto his property, and creating a good deal of noise during operation.[18] The pump was repaired, and the complaint was settled without the Army assuming blame for damages.[19] In 1976, the leaching field was enlarged to meet the state health code criteria for subsurface disposal. In 1978, the leaching field was reconstructed and enlarged again.[20]

In 1980, the leaching field was evaluated by the New York District Corps of Engineers. This study proposed several alternatives, including expansion of the existing leach field and returning to the use of individual septic tanks. These alternatives were rejected because the soil conditions (loose, gravelly, silty sand-till, a low percolation rate) makes the soil marginally suitable for septic systems.[15] The low permeability of the soil restricts the amount of leachate that can percolate through the soil. The site is also on the side of a hill, and in the past, breakouts occurred at the face of the hill. Other alternatives included using a package treatment plant to treat the sewage; no receiving stream is nearby, however, and the town's sewer system is three miles away, making this a prohibitively expensive alternative. The most recent suggestion was water-saver toilets, but this option was dismissed as being a temporary cure and not the long-term solution that the system needed.[20]

In 1980, four septic tanks in support of the housing units were added to the leach field on the former fire-control site. In 1983, a request to install two additional septic tanks was not approved. It was determined that the installation of these added tanks would not substantially improve system performance.[20]

In March 1983, a lawsuit was filed by the owners of the property adjacent to the Army housing area for damages allegedly caused by Army sewage running off from an improperly designed sewage system. The case was settled by means of the Army paying a sum of money to the plaintiffs; part of the sum was earmarked as a construction company fee to regrade the plaintiff's land so as to preclude any future sewage runoff problems.[21]

In 1984, the Corps of Engineer investigation of the Shelton housing area was completed. Three recommendations were offered: (1) the family housing area should be closed as soon as practical (within five years); (2) existing leaching chambers should be pumped out as required to prevent failures in the leach beds; and (3) any maintenance on

the housing units should be limited strictly to what is required to maintain the units for five years.[15]

3.2 FORMER UNDERGROUND FUEL-STORAGE TANKS

Each housing unit has a 275-gallon underground fuel tank located behind the house. One fill pipe cap, located behind unit #9, was broken; its tank was full of liquid. The status of these tanks is uncertain. The other Connecticut Army housing areas had all of their underground tanks replaced with above-ground tanks approximately two years ago. At that time, the underground tanks, which remained in-ground, were filled with sand. The Shelton site did not have this renovation performed because of the previous decision to close the site by 1989. It is unclear whether the Shelton tanks were filled with sand when they were recently decommissioned; this information was not available from the Army Corps of Engineers.

Although no documentation was found to indicate a failure in any of the Shelton underground tanks, informal information from other Connecticut housing areas indicate original underground tanks did have several occurrences of failure and leaks prior to their removal in 1987.

The presence of three underground storage tanks at the former fire-control site was evidenced by the vent tubes located during an environmental investigation conducted by Ft. Devens on November 1988.[20] The tanks were used for heating oil storage, and it is unknown how they were decommissioned. No documentation was found to indicate that integrity or leak tests were ever performed on these tanks.

Since all underground tanks at Shelton were installed in 1958, when the Nike battery was commissioned, they are assumed to be at the end of their useful life. Since no documentation was found to indicate the tanks were installed with cathodic protection or other protective coatings, or that they were properly decommissioned or abandoned, they present an unknown potential for environmental risk of soil contamination.

3.3 TRANSFORMERS

Four unlabeled electrical transformers are located on the former Nike fire-control site, as reported by a 1988 investigation.[20] These are owned by the Army. No documentation could be located which provides information on the presence of PCBs in the transformers. However, no evidence of spills or leaks from the transformers was observed.

3.4 MATERIAL DRUMS

The office of the Area Facilities Engineer used a portion of the headquarters building located on the former fire-control site for office space, a work shop, and occasional storage. At the time of the 1988 investigation, three drums were found inside the old building. One 55-gallon drum (approximately one-quarter full), labeled

"weedkiller," contained 33% sodium arsenite, 9% cresylic acid, and unspecified "inert" ingredients. The term "inert," when used to describe formulations, refers only to ingredients with no pesticidal activity and thus with no need to be specifically identified on the label. Inert ingredients may nonetheless be hazardous in character and detrimental to the environment. One 30-gallon drum (full) was labeled "Sure-Flow Liquid Pipe Opener." Its contents are assumed to be corrosive and thus a hazardous waste. The third drum contained less than 1 inch of fluid, and thus, can be considered to have been empty.[20] Fort Devens housing personnel reported that these drums are still present in the building.

3.5 ASBESTOS

The 1988 investigation report conducted by Ft. Devens stated asbestos was present in the headquarters, mess hall, and barrack buildings on the former fire-control site. The amounts on the pipes in each of these three buildings are estimated to be 200, 250, and 300 linear feet, respectively.[20] The condition of the insulation was reported as generally good. These buildings might have asbestos in the floor tiles, as well.

The report also indicated that asbestos was present in the family housing units.[20] The one house whose interior was visually inspected during the initial site visit was found to have asbestos insulation on the pipe leading from the hot water heater. The report indicated that this insulation showed little deterioration. This condition exists in the other housing units, as well. Access to these buildings was not possible since the houses are all boarded shut. These conditions could not be confirmed.

3.6 BURIED WASTE

Waste materials removed from the old leaching field are reportedly buried on the fire-control site in an area north of the pump house. The new leach field was constructed in the same location as the previous field, and the waste was removed from the original field and deposited in a different area on the control site. The content of this waste is unknown, and no documentation indicates sampling was ever performed in or around the burial site. The exact location of the burial site and the details of waste placement are unknown.

4 KNOWN AND SUSPECTED RELEASES

The septic system of the former fire-control site is reported to have failed repeatedly. The releases from the leach field have run down the hill slopes to the private residences bordering the western boundary of the area. Although these releases should have been mostly biodegradable human waste, no reports exist to verify that other wastes had not been discharged to the sewage system, and no samples have been taken to characterize the releases. This leach field also served the former fire-control site. The control site contained radar tracking operations and the administration, barracks, and mess of the Shelton Nike battery. Chlorinated organic solvents, hydrocarbons, oxidizing agents, and acids may have been generated at the fire-control site. The area has a high water table and a low rate of permeability for the soils; these conditions contributed to the overflow problems experienced at the leach field. Surface runoff would provide the means for carrying the contaminants displaced from the leach field downslope to the family housing area, as well. Soil, groundwater, and surface water could all have been contaminated by such a release.

A strong potential exists for leakage from the old underground fuel tanks still buried at the rear of the housing units. The tanks are 30 years old and are therefore assumed to be at the end of their useful life. No documentation indicates that these tanks had cathodic protection or other protective coatings when installed. No integrity or leak tests have been performed on the tanks. Details of how the tanks were decommissioned are unknown, but some fluid was observed in one of the tanks during the site visit.

The three underground fuel heating tanks and the two underground gas tanks located on the former fire-control site were also believed to have been installed during original construction; they are also assumed to be at the end of their useful lives. Information on decommissioning and current status of these tanks was also not located.

The four electrical transformers on the former fire-control site are owned by the Army. These are unlabeled and are thus assumed to have the potential of containing PCBs. Although the electrical transformers appear uncorroded, the risk of PCB leakage and contamination persists.

Two drums in the headquarters building of the fire-control site contain significant quantities of fluid. Since these fluids may be hazardous materials, their storage circumstance needs to be specifically controlled. No spill containment provisions were indicated around the drums, according to the environmental report issued from Fort Devens. Neither drum is clearly labeled as to its contents. It is unclear whether these materials are currently in use by the Area Facilities Engineer.

Asbestos is present in the headquarters, mess hall, and barracks buildings on the former fire-control site. Asbestos is also present in the family housing units in the insulation around the water heater pipes. The condition of the insulation was generally good.

Waste was removed from the old leach field and buried in an area north of the pump house. No documentation exists on the nature and chemical characteristics of this waste or on the design and construction of this disposal area. This waste disposal site presents an unknown potential for soil and groundwater contamination.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

The Shelton housing property was originally developed as part of a Nike missile battery providing antiaircraft defense for the Bridgeport, Conn., area. The housing area is immediately adjacent to the former control site of the Shelton Nike battery, and it is possible that Nike missile-related wastes associated with the operation and maintenance of the control site have migrated to the housing property. A common leach field shared by the two sites was documented as having failed, and outbreaks from the septic feeder lines at the base of the hill were known to spread septic tank wastes. This sewage-treatment system is likely to have received only domestic waste, however. The wastes generated at the control site included solvents, heavy metals, and organics. There is no documentation that such missile-related wastes were ever released to the sewage-treatment system.

Several options to solve the sewage problem were proposed by the New York District Army Corps Engineers. All these were either rejected or discounted as temporary cures, not long-term solutions. It was decided in 1984 that the sewage could not be handled in this area by means of leach fields; the decision was based on the soils having a low percolation rate coupled with a very high water table. It was decided to close the property as soon as possible (within five years). The last residents vacated the property in June 1989. The sewage problem remains unresolved; restarting the treatment system would very likely lead to the same problems previously encountered.

The original underground heating tanks are still in service at this housing area. Assuming an expected lifetime of approximately 20 to 25 years, these tanks are at or near the end of their useful life. Since none of these tanks has cathodic protection or other protective coatings, it can be assumed that the tanks have a high probability of leakage. Experiences at other Connecticut sites using these same types and vintages of tanks have indicated failures of some of the original tanks. Since integrity testing has never been performed on any of the tanks at Shelton, conclusive statements regarding their integrity are not possible.

Real property cards indicate asbestos-containing materials were used in the floor tiles of the housing units. Asbestos is present in the headquarters, mess hall, and barracks buildings on the former fire-control site -- both in floor tiles and water pipe insulation. Asbestos is present in the insulation around the water heater pipes of the housing units, as well.

6 RECOMMENDATIONS

The following action is recommended prior to excessing this housing area.

- Remove the original underground tanks behind each housing unit; any contamination encountered should be remediated. Sampling is recommended in the tank excavations and the area around the tanks to confirm the absence of petroleum contamination.

This recommendation assumes that the property will most likely resume its residential housing function.

Although the former fire-control site parcel is not being excessed at this time, the following actions are recommended:

- Remove abandoned underground tanks; remove any contaminated soils encountered; sample tank excavations for petroleum contamination.

- The four out-of-service transformers located on the site should be sampled for PCBs and labeled accordingly.

- The material drums stored in the headquarters building of the former fire-control site must be put into secure storage or disposed of properly. Since this area has a high likelihood of vandalism, it is recommended this action be carried out as soon as possible.

- The area of the fire-control site in which wastes previously removed from the original sewage treatment system were buried should be sampled for the presence of Nike-related contaminants.

- The current leach field and septic tank should be sampled for contaminants characteristic of Nike control site-related activities.

- Assuming the well on the former fire-control site was abandoned but not sealed off, sample groundwater from the well for contaminants characteristic of control site activities.

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APPENDIX:

PHOTOGRAPHS OF SHELTON HOUSING FACILITY AND SURROUNDING LAND

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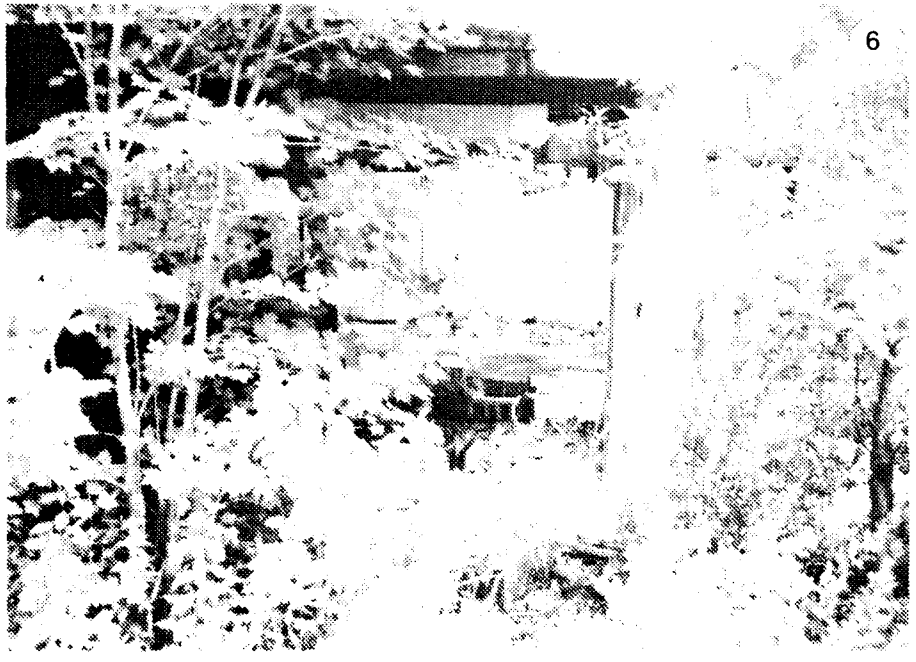
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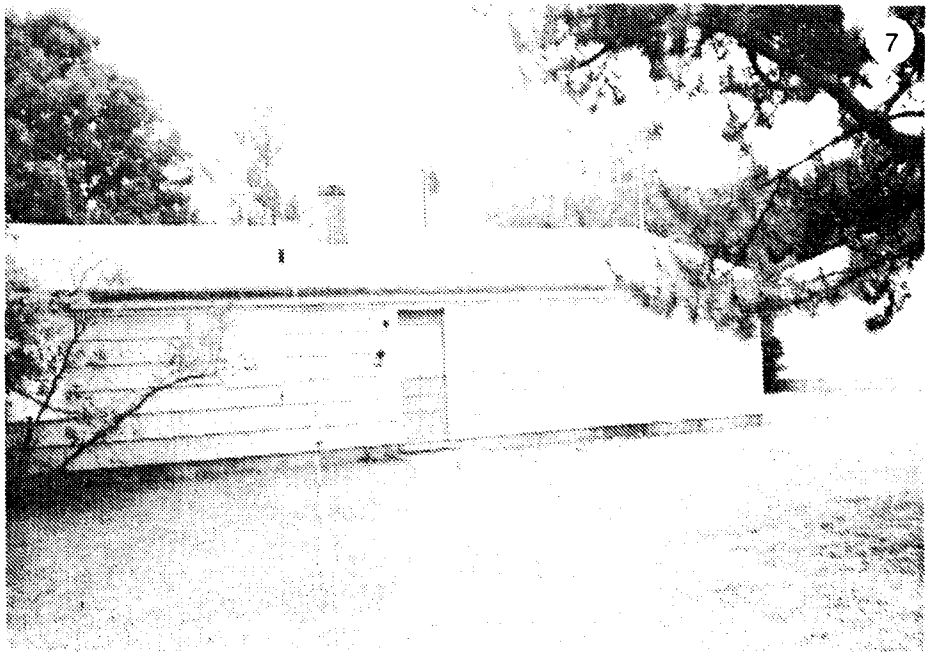
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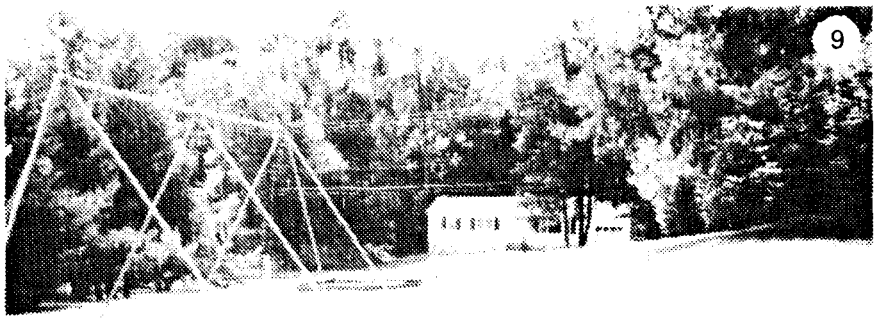
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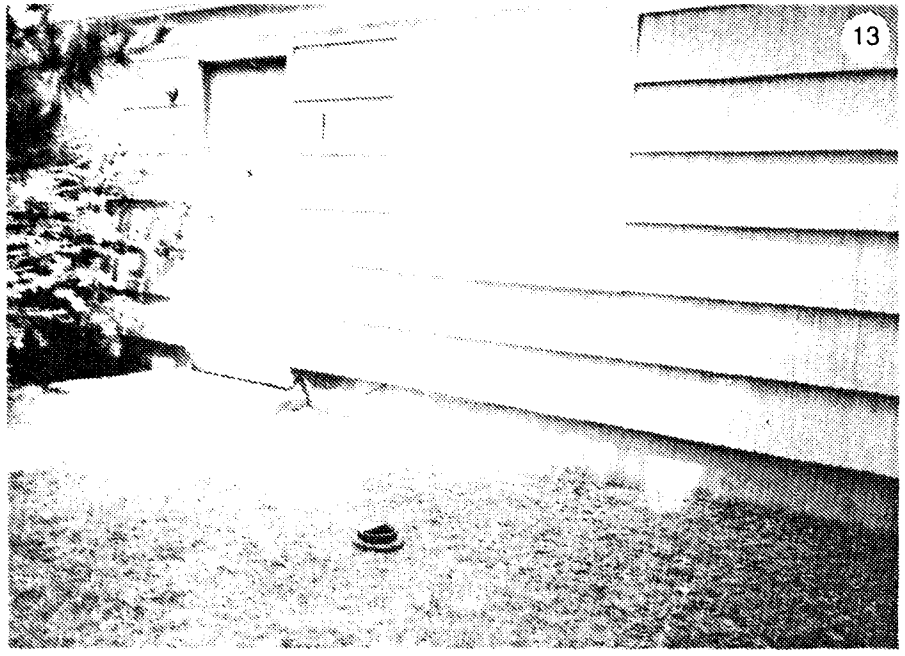
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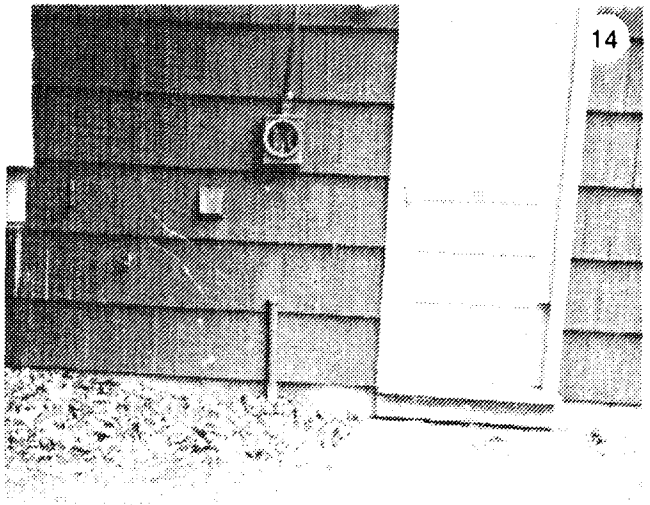
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IDENTIFICATIONS OF PHOTOGRAPHS

Former Fire-Control Site of Shelton's Decommissioned Nike Missile Battery

1. Entrance to site; gate left open allowing free access to the property.

2. Former headquarters building; this building appears to be affected by acts of vandalism; present status of hazardous-waste drums stored at building is unknown.

3. Water storage tank; water well and pump house to right of tank (not shown here).

4. Abandoned leach field at the former fire-control site.

5. Abandoned water heater and other debris.

6. Abandoned control pad; pad located at a higher elevation than surrounding buildings on the former fire-control site.

Housing Site

7. Capehart-style house, vacated and boarded up.

8. Debris left behind in carport of a vacated and boarded-up house.

9. Playground, at center of housing area; in background is a private residence.

10. Rock wall along eastern border of area; beyond the rock wall are woodlands and private residences.

11. Electrical transformer at the top of a utility pole, erected on government-easement land; housing-area transformers are the responsibility of the local utility company, whereas the transformers on the former fire-control site belong to the federal government.

12. One of the in-ground trash bins located behind the housing units.

13. Broken cap of a water pipe in front yard of unit #6; water seepage was observed around the pipe.

14. Fill pipe and vent pipe of an underground storage tank, in front of a boarded-up unit.

15. Soil saturated with oil near a buried oil storage tank at the rear of unit #14.

16. Sewer-system manhole at the top of the concrete block; near unit #16.

17. Lift station for sewage, at the end of housing area's road.

18. Sewage lift-station building, enclosed in fenced area; lift station was last used in June 1989, at which time eight housing units were occupied; currently, all units are vacant and the houses boarded up.

19. Covered concrete trough on the ground (center of view); several such concrete troughs were seen at various locations between the housing units.

20. An open concrete trough on the ground.